

AI-based Medical Data Analytics and Clinical Workflows

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Abstract

We lay out our plan to build a platform called Artificial Intelligence for Medical Image Analysis (AIMIA) in this talk. The AIMIA platform consists of Artificial Intelligent Engines (AI Engines) and Augmented Intelligence Workflows (AI Workflows). The AI Engines include high-performance algorithms and software modules aiming to extract insightful information from a large volume of medical image datasets accurately, efficiently, and robustly. In particular, the AI Engines include Image Processing, Quantitative Analytics, Deep Learning, Machine Learning, and High Dimensional Data Analysis Toolboxes to analyze medical images. By taking these algorithms and software modules as the building blocks, we further build up innovative AI Workflows in various clinical applications. AI Workflows examples include precision cancer treatments in a lung, hypopharyngeal, hepatocellular carcinoma, digital pathology whole slide image analysis for prostate cancers, pancreatic masses classification and detection, radiotherapy treatment planning in lung cancer, and psychiatric disorders phenotyping. These examples illustrate how we apply the AI Engines to configure AI Workflows in clinical medical cares and biomedical research. AIMIA is also a platform allowing interdisciplinary experts from academia and industry in medical, mathematical, statistical, computational, and information sciences to work together to ensure the research and development efforts can benefit the society broadly.